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OPERATIONAL CAPABILITIES OF COMMUNITY  
FALLOUT SHELTER SYSTEMS

INSTRUCTION MANUAL  
for  
Evaluation Instrument

William D. Shontz

April 1963

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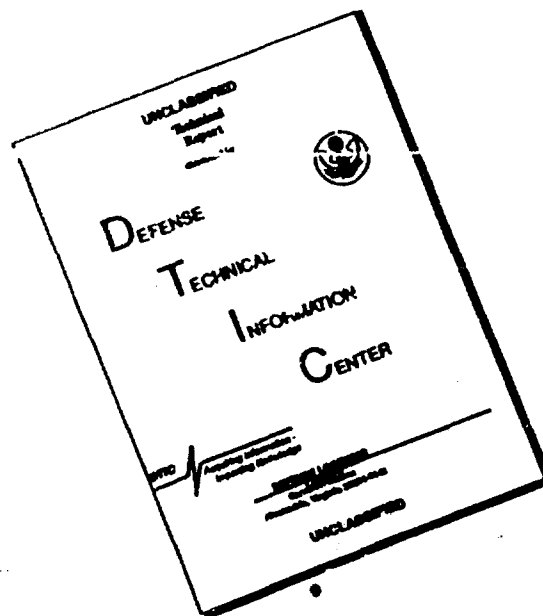
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AMERICAN INSTITUTE for RESEARCH  
PENINSULA OFFICE

8 West 41st Avenue, San Mateo



California . . . Flreside 1-9297

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This Final Report and its accompanying working documents, the Evaluation Instrument, Instruction Manual for the Evaluation Instrument, and Workbook For Use By Local Civil Defense Officials, have been reviewed in the Office of Civil Defense and approved for publication and limited distribution for purposes of OCD research, shelter planning, and guidance material development. Contents of these documents do not necessarily reflect the views and policies of the Office of Civil Defense.

Main Office 410 Amberson Avenue, Pittsburgh 32, Pennsylvania

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## CONTENTS

	Page
INTRODUCTION . . . . .	1.
EVALUATION PROCEDURE . . . . .	3.
SCORING PROCEDURE . . . . .	6.
CRITIQUE PROCEDURE . . . . .	9.

## INTRODUCTION

The accompanying Evaluation Instrument contains 487 plan factors which have been identified as being of varying degrees of importance to the operational capability of a community fallout shelter system. These factors are organized into 33 subject-matter categories. The categories are:

GENERAL	WATER
OPERATIONAL PLAN	FOOD
PLAN/COMMUNITY COMPATIBILITY	SLEEP
POPULATION INDOCTRINATION AND TRAINING	SANITATION
SHELTER ASSIGNMENTS	MEDICAL
SHELTER MANAGEMENT (Pre-Emergency)	SPACE-VOLUME REQUIREMENTS
SHELTER STOCKING	LIGHTING
SHELTER DESIGN	POWER SUPPLY
SHELTER UTILIZATION PLAN	CONTINGENCY PLANNING
PERIODIC MAINTENANCE	COMMUNICATION
POST-SHELTER PLANNING (Pre-Emergency)	CONTROL
COORDINATION	MAINTENANCE
WARNING SYSTEM	NOISE
INGRESS	TRAINING
RADIOLOGICAL DEFENSE	RECREATION AND RELIGIOUS ACTIVITIES
SHELTER MANAGEMENT (In-Shelter)	POST-SHELTER PLANNING (In-Shelter)
ATMOSPHERE CONTROL	

Grouping the plan factors by subject-matter categories (and in some cases sub-categories) serves the purpose of providing a classification system whereby the user can readily locate a particular plan factor. It also provides a basis for summarizing the results of an evaluation in terms of major functions of the system such as Shelter Management and Radiological Defense.

Each plan factor item in the Evaluation Instrument has been assigned a weighted score corresponding to its judged importance to system effectiveness. This score is based on ratings of the effect of not providing for the factor in a community shelter system. Be prepared, then, to think of the weighted scores as being negative in value. Possible item weights range from 1 to 100. The assigned weight is directly proportional to the judged seriousness of

omission of the factor from the shelter system.

The Evaluation Instrument is intended for use by Office of Civil Defense personnel whose responsibility it is to assess the operational capability of community fallout shelter systems by examination of descriptions submitted to them for this purpose. It is designed to be applicable in evaluating systems which may vary across a wide range in parameters such as community size and shelter types. It can also be used to evaluate shelter systems in all stages of development from a completely "paper" system to one which is fully operational. Appropriate shifts in verb tenses within individual items are all that is required to make the instrument applicable regardless of the phase of system development.

Scores are obtained for each category based on the presence or absence of provisions for applicable plan factors. A profile of category scores is prepared to illustrate the results of the evaluation. Weak points in system planning are critiqued to provide guidance for local civil defense officials.

### EVALUATION PROCEDURE

Prior to beginning the item-by-item evaluation of a shelter system, two preparatory steps should be taken. First, read all the material pertinent to the system until you are thoroughly familiar with its arrangement and the method of classifying information. This will be time well spent particularly if the material cannot be rearranged to parallel the Evaluation Instrument. Second, if possible and necessary, rearrange the material to parallel the Evaluation Instrument. Accomplishing these two things first will greatly facilitate the evaluation and reduce the possibility of under-evaluating a shelter system by overlooking information pertaining to the plan factors.

Upon completion of the preparatory phase, carry out the following four steps:

1. READ, IN TURN, EACH PLAN FACTOR ITEM
2. DETERMINE WHETHER OR NOT THE FACTOR HAS BEEN PROVIDED FOR
3. MARK THE EVALUATION BOOKLET TO INDICATE WHETHER OR NOT  
THE PLAN FACTOR HAS BEEN PROVIDED FOR
4. CHECK THAT EACH ITEM HAS BEEN MARKED

The following detailed procedures will aid in carrying out these four steps:

1. READ THE PLAN FACTOR ITEM

With the exception of the items in the first category, all verbs are future tense. This enables you to evaluate plans to provide for the various plan factors although no other action has been taken. When the shelter system is operational or becoming so, simply read the item in the present tense, e.g., "are . . . to be" would be read "are . . . being" or "are."

2. DETERMINE WHETHER OR NOT THE FACTOR HAS BEEN PROVIDED FOR

The ease with which this step can be performed will depend a great deal on the format and comprehensiveness of the material being evaluated. If the system of classifying the data approximates that used in the Evaluation Instrument, this task will be a relatively simple one. If not, the difficulty in positively determining the presence or absence of a plan factor will be directly proportional to the disparity in organization of the material and the Evaluation Instrument. A good working knowledge of where in the material various aspects of the system are treated will be most helpful at this point.

In most cases, it will be a matter of determining whether something has been done or will be done to provide for a given plan factor as opposed to no

mention of it in the material. Although adequacy of provision is a very important aspect, little or no objective data are available at this time for use in making such decisions on most of the plan factors. Where such data are available, they are included directly below the pertinent plan factor item and identified by the word STANDARD. The level indicated in the standard is considered minimal in providing for the factor.

The decision as to whether a given plan factor has or has not been provided for should be tempered by several considerations. Among these are:

- (a) What stage of development is the system in (preliminary planning, detailed planning, developmental, operational)?
- (b) Are all aspects of the system discussed to the same level of detail?
- (c) Have assumptions been made regarding basic system objectives which preclude the necessity of providing for the factor?
- (d) Have other plan factors been provided for in such a manner that the factor under consideration is also provided for?

Try to be as objective as possible in determining the presence or absence of a plan factor. However, if you must be subjective in reaching a decision, be consistent in the manner in which you exercise your judgment. For example, if you infer provision for a plan factor in one instance, given the same amount of information, you should make like inferences for other factors. In the interest of providing a fair and helpful evaluation, however, a plan factor should not be considered as having been provided for without definite statements and/or data to that effect in the system documentation.

3. MARK THE EVALUATION INSTRUMENT TO INDICATE WHETHER OR NOT THE PLAN FACTOR HAS BEEN PROVIDED FOR

Depending on the outcome of the preceding step, there are three possible ways to mark the item. The three possible item responses are listed on the right hand side of the page opposite each item. They are: N/A for "not applicable"; Y for "yes"; and a number which is the item weight for "no."

If you determine that the plan factor is not applicable to the shelter system being evaluated, circle the N/A to the right of the factor.

Example:

On an above-ground shelter, are barriers to be used to reduce blast effects?

(N/A)

Y

81

If you determine that the plan factor has been provided for, circle the



Y to the right of the factor.

Example:

Is all primary shelter space to have a protection  
factor of 100 or better?

N/A

(Y)

92

If you determine that the plan factor has not been provided for, circle  
the number to the right of the factor.

Example:

Are provisions to be made for stocking food in the  
shelters?

N/A

Y

(100)

The item weight is used rather than "no" for a negative response since  
"no" answers are the only ones to be given a numerical value in the scoring  
system. This greatly simplifies the scoring procedure as will be explained  
in the next section.

#### 4. CHECK THAT EACH ITEM HAS BEEN MARKED

Before leaving a category and proceeding to the next, check each item to  
make sure one of the three possible response choices has been circled. One  
of the three possible responses must be circled for each item. In the case of  
control items (see next paragraph), check that the instructions concerning them  
have been followed.

#### CONTROL ITEMS

Several of the categories contain items which determine the response to,  
several or all items following them in the category when they are responded to  
negatively. These items are followed by notations in capital letters which  
identify the control item and the items which are affected by it. In all cases,  
when a control item receives a negative response those items which are affected  
must be marked N/A.

### SCORING PROCEDURE

Scoring the Evaluation Instrument involves the following four steps:

1. COMPUTE TOTAL SCORE FOR EACH CATEGORY
2. TRANSFER CATEGORY TOTALS TO COMPUTATION SHEET
3. COMPUTE CONVERTED SCORES FOR EACH CATEGORY
4. PLOT CONVERTED SCORES ON OPERATIONAL CAPABILITY PROFILE

A more detailed description of how to perform these four tasks is given below:

1. COMPUTE TOTAL SCORE FOR EACH CATEGORY

Computing the total score for a category is simply a matter of summing those numbers in the third column of the response choices which have been circled. Do this carefully and double check your results. It is easy to make errors of inclusion or exclusion when adding only certain portions of a column of numbers.

Enter the results of your addition in the space provided to the right of the words CATEGORY TOTAL.

When the items for a single category occupy more than one page, additional summing of sub-totals will be required. Each page of a multi-page category will have a sub-total entry at the bottom entitled Page Total with an appropriate space to the right of it for recording the sum of the encircled numbers for that page. The last page of a multi-page category will have two types of sub-total entries plus the CATEGORY TOTAL entry. The two sub-total entries are a "Page Total" for the last page and a "Total for Page \_\_\_\_" for every page in the category.

To arrive at a category total for a multi-page category, simply carry the Page Totals forward to the last page of the category and enter them in the space provided. Although the order in which sub-totals are recorded will not affect the CATEGORY TOTAL, a specific space will be provided for each page total for cross-check purposes. For example, the sub-total and category total entries on the last page of a category three pages long would appear like this:

N/A    Y    7  
Page Total    13

Total for Page 18    2  
Total for Page 19    70  
Total for Page 20    13  
CATEGORY TOTAL    85

## 2. TRANSFER CATEGORY TOTALS TO COMPUTATION SHEET

The COMPUTATION SHEET near the front of the Evaluation Instrument booklet has two major sub-divisions. The plan factor categories are listed on the left side of the page in the order they appear in the Evaluation Instrument. The right side of the page contains a Maximum Score and spaces for entering the Category Total score and Converted Score for each category.

Column headings across the upper right hand side of the COMPUTATION SHEET identify the spaces to be used for the various scores. The columns are arranged to facilitate the computation of the Converted Scores for each category.

Place the Category Total scores calculated in step 1 in the spaces provided under the column heading Category Total across from the correct category titles.

## 3. COMPUTE CONVERTED SCORES FOR EACH CATEGORY

As can be seen on the Computation Sheet, each category has the same Maximum Score. To compute the Converted Score for a category simply subtract the Category Total score from the Maximum Score.

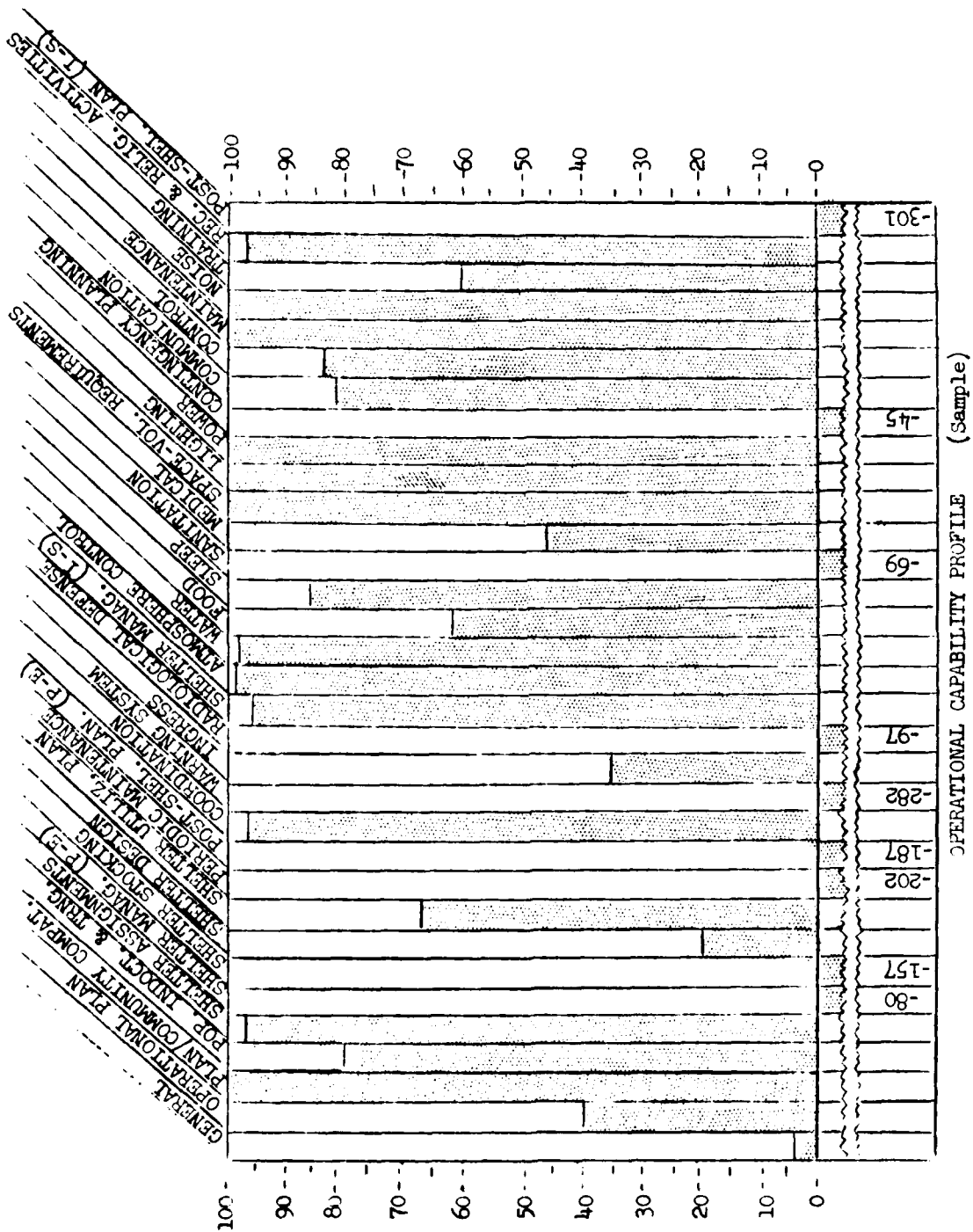
If important plan factors within a category are not provided for in the shelter system it is quite possible for the Converted Score to be zero or even negative. When the Category Total score is larger than the Maximum Score be sure to include a minus sign in front of the Converted Score.

This seemingly impossible situation of being able to achieve a Category Total score which is larger than the Maximum Score is a consequence of the scoring technique. A full explanation of the development of the scoring technique and the rationale for it can be found in the Final Report covering the technical aspects of the development of the Evaluation Instrument.

## 4. PLOT CONVERTED SCORES ON OPERATIONAL CAPABILITY PROFILE

A profile chart for plotting the Converted Scores is provided in the front of each Evaluation Instrument booklet. When completed, the chart provides a graphic presentation of the shelter system's operational capability. A sample profile chart is included on the next page to illustrate this.

The profile format resembles a bar graph. The area assigned to each category is identified by the category title at the top of the chart. Positive Converted Scores for the categories are plotted directly on the chart using the 0-100 scale on the side of the chart. Negative Converted Scores are given a token shaded area below the zero line and the actual negative score is then entered in the category's area directly below the shaded portion.



#### CRITIQUE PROCEDURE

After completing the numerical evaluation of a shelter system (ending with completion of the Operational Capability profile), a critique should be prepared which interprets the scores received on each category. The evaluator should be completely familiar with the item weighting and scoring system used in the Evaluation Instrument before attempting this.

Since the Critique will be of necessity critical in nature, concrete suggestions as to how the shelter system can be improved should be included whenever possible. The form and extent of these suggestions are of course a matter of policy to be determined by the Office of Civil Defense.

Several points to be kept in mind when preparing a critique are listed below for the evaluator's convenience.

1. No system failure point has been identified on the positive portion of the profile scale. However, if a score of zero or below is obtained in any category the shelter system can be considered to have failed in accomplishing its objectives.
2. Whenever a category receives a zero or negative score, the factor or factors whose omission caused the situation should be identified and corrective action suggested.
3. The seriousness of low positive scores is dependent upon the cause. If a category has many plan factors and several less important factors have not been provided for, the converted score for the category may look suspiciously low. Since certain combinations of absent factors could result in equal scores but unequal total effects, inspection of individual items is also recommended for low positive or negative category scores.
4. The more negative a score the more deficient the system is in that category.